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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/518,343	01/05/2005	Yves Fouillet	122001	5207
25944 7590 07/23/2010 OLIFF & BERRIDGE, PLC P.O. BOX 320850 ALEXANDRIA, VA 22320-4850				
EXAMINER LEVKOVICH, NATALIA A				
ART UNIT 1797		PAPER NUMBER		
NOTIFICATION DATE 07/23/2010		DELIVERY MODE ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

OfficeAction25944@oliff.com  
jarnstrong@oliff.com

# Office Action Summary

**Application No.**

10/518,343

**Applicant(s)**

FOUILLET ET AL.

**Examiner**

NATALIA LEVKOVICH

**Art Unit**

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 26 April 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 37-51 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 37-51 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/CD)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Response to Amendment*

1. Applicant's amendments and remarks filed on 04/26/2010 have been acknowledged.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office Action.

### *Drawings*

3. The drawings remain objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims, as well as any structural detail that is essential for a proper understanding of the disclosed invention. Therefore, the isolating chambers taking each of the two positions, as recited in claim 41, must be clearly shown *and referenced*, or the feature(s) canceled from the claim(s). No new matter should be entered.

Currently, elements 201, 202 in Figures 1- 3 are shown as valves. None of the drawings, however, illustrates and references chambers disposed between the operative cavity [3] and a 'respective one of the inlet duct and the outlet duct' [41, 42], as currently recited, that are configured to be in two different positions.

Correction is required.

***Claim Rejections - 35 USC § 112***

4. The previous rejection of claim 50 under 35 U.S.C. 112, first paragraph, has been withdrawn in view of the latest amendment to the claim.
5. Claim 41 remains rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 41 recites two isolating chambers disposed between the operative cavity and a respective one of the inlet duct and the outlet duct', each isolating chamber being configured 'for being 'in an open position that establishes communication between the respective one of the inlet duct and the outlet duct with an outside, and a closed position that isolates the respective one of the inlet duct and the outlet duct from the outside'. Upon further reviewing of the original disclosure, no adequate support for this limitation was found. The specification describes 'two isolating means (201 and 20), placed respectively on the two ducts', which appears to be a description of active valves. Nowhere the specification describes chambers each configured to take two different positions [i.e., 'places occupied or to be occupied'] and disposed between the operative cavity and a respective duct, as currently recited.

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6. Claim 37-51 are rejected under 35 U.S.C. 112, second paragraph, as being unclear for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The amended claim 37 recites a heat exchanger 'that exchanges heat with one and/or the other gas trapping chamber to control a pressure of a gas in one and/or the other gas trapping chamber, wherein the pressure of the gas in the one and/or the other gas trapping chamber controls the flow of the liquid'. It remains unclear how the recited control of the temperature and pressure can be implemented in the absence of any means (such as pressure and/or temperature sensors) for providing feedback information to a controller, the feedback being absolutely necessary for any control. It is further unclear whether or not any logic device [controller] is intended. Examiner emphasizes that the above mentioned feedback means would be required for performing the control of pressure and temperature as recited, and, therefore, are considered essential structural elements of the claimed apparatus. It is maintained that the claim is incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01.

With respect to claim 39, it remains unclear *from the language of the claim* what structural features of the capillary valves would provide for generating the 'overpressure at a meniscus between the gas and the liquid, the overpressure substantially preventing displacement of the liquid beyond the capillary valve'.

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Note that, although the claims are interpreted in light of the specification, *limitations from the specification are not read into the claims* (unless proper 'means plus function' language is included into the claims) .

Claim 40 recites each capillary valve comprising a base portion, 'wherein a cross section of the base portion widens in a direction of a concavity of the meniscus if the liquid is a wetting liquid, or the cross section of the base portion narrows in the direction of the concavity of the meniscus when the liquid is not wetting liquid'. This recitation renders the claim indefinite because the shape of meniscus in a capillary depends not only on the nature of a fluid, but also on the nature of the interior surface of the capillary. In particular, wetting effects are defined by the difference between the surface energy of a solid substrate (related to hydrophobicity or hydrophilicity of the surface) and surface energy of a liquid. Therefore, the shape of meniscus for a liquid depends not only on the nature of the liquid, but also on the surface energy of a structural element contacting the liquid. Examiner maintains that, for the reasons explained above, the claim is indefinite, and that one of ordinary skill in the art would not be reasonably apprised of the shape of the valve recited as being dependent on some 'direction of a concavity' [?] of the meniscus of a wetting or non-wetting liquid.

Claim 41 recites two isolating chambers, each configured for being 'in an open position that establishes communication between the respective one of the inlet duct and the outlet duct with an outside, and a closed position that isolates the respective one of the inlet duct and the outlet duct from the outside'. Based

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on the plain meaning of the term 'position' (that is, 'a place occupied or to be occupied'] and assuming that the chambers are not intended to be moved relative to other structural components, it is unclear whether or not the recitation means that each chamber must include an active valve having an element configured to be moved between two positions.

The newly added claim 51 recites the device being configured 'to retain gas in the two gas trapping chambers when the two gas trapping chambers are at a filling temperature and the device is configured to isolate the operative cavity such that a leakage of the liquid and/or a diffusion of particles contained in the liquid to the inlet duct and the outlet duct is prevented when the two gas trapping chambers are at an isolation temperature that is greater than the filling temperature'. It is unclear how the recited functionality can be implemented without any means for setting and measuring at least two pre-determined ['filling' and 'isolation'] temperatures, as well as without a controller connected to such means and to the heater. See MPEP § 2172.01. Additionally, 'particles contained in the liquid', lack antecedency.

### ***Claim Rejections - 35 USC § 102***

7. Claims 37-51 are rejected under 35 U.S.C. 102(a) and (e) as anticipated by Mian (US 20010055812).

With respect to claims 37-48 and 51, Mian discloses micro-fluidic test devices comprising, as shown in Figures 26, 23A and described in Examples 9

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and 6, inlet and outlet ducts communicating with an 'operative' cavity [not indexed; shown as the forth central cavity from the top] by means of respective valves. The 'operative' cavity further communicates with at least six other cavities with 'substantially identical' volume, namely, with two respective 'expansion' / 'isolating' chambers [shown as the third and the fifth central cavities from the top] and with two 'trapping' chambers connected to the corresponding ducts or / and to 'expansion' chambers via respective diagonal channels ['connecting channels']. Any further central cavity can be used as an incubation chamber. Mian also teaches in paragraph [0150] that 'temperature control elements, particularly heating elements', can include' heat lamps, direct laser heaters, Peltier heat pumps, resistive heaters ultrasonication heaters and microwave excitation heaters ['heat exchange devices that exchange heat'], which can be 'applied to the disk as a whole or in specific areas on the disk', including the 'trapping' chambers (as well as other chambers). In particular, Mian describes in [0299] the configuration of reaction chamber G ['gas trapping chamber' -see Figure 23A] which includes 'cooling and heating means via a Peltier component'. When the temperature in the chamber(s) changes to one or more predetermined values under control of an automatic controller, the pressure, as well as hydrodynamic conditions defining the liquid flow and liquid component diffusion, must change accordingly.

Regarding claim 37- 40, it is also noted that the first and second valves 'with no moving parts' ['capillary valves], as well as the first and second connecting channels, are not positively recited as a part of the claimed invention,



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and, therefore, these components, including all their details (such as the base portion of the valves), are not accorded any patentable weight.

Regarding claim 47, Mian further teaches in [0312] that the cavities can comprise beads and / or magnetic particles covalently linked to DNA ['particles that form a support functionalized with ligand'].

Referring to claims 49- 50, Figure 26 shows micro-valves ['particle retaining devices'], arranged in contact with the inlet on every channel connecting each couple of adjacent cavities and configured for being actuated magnetically – (see paragraph [0220]). The micro-valve arranged at the outlet (the central valve shown in the bottom) would be downstream of a heater arranged at any other portion of the micro-fluidic circuit (see the discussion above).

### ***Response to Arguments***

8. Applicant's arguments filed on 04/26/2010 have been fully considered but they are not persuasive, or moot in view of new grounds of rejection.

Applicant argues that 'Mian does not describe any relationship between the temperature control elements and any gas trapping chambers. Mian merely describes that a temperature control element can be fabricated onto the disk'. Applicant further argues that the liquid flow in the apparatus of Mian, 'is controlled by the speed of rotation and time during which the valve to the reagent is open'. Based on this statement, Applicant concludes that 'Mian does not describe that the pressure of the gas in the one and/or the other gas trapping

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chamber controls the flow of a liquid in the device, as recited in claim 37'.

Examiner disagrees. Mian describes in [0299] the configuration of reaction chambers, for example, chamber G ['gas trapping chamber' -see Figure 23A] with 'cooling and heating means via a Peltier component'. When the temperature in the chamber(s) changes to one or more predetermined values under control of an automatic controller, the pressure, as well as hydrodynamic conditions defining the liquid flow and liquid component diffusion, must change accordingly, thus controlling the liquid flow in the device. Examiner also notes that the instant claims do not preclude rotating the device. Additionally, a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art. The apparatus of Mean reads on the instant claims, since it has the structure comprising all limitations as recited.

### ***Conclusion***

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory

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action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Natalia Levkovich whose telephone number is 571-272-2462. The examiner can normally be reached on Mon-Fri, 2 p.m.-10 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on 571-272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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/Natalia Levkovich/

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